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Fall 2018

# Biology II (BIO1201) Syllabus

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*CUNY New York City College of Technology*

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# BIOLOGY II (BIO1201) SYLLABUS

	<b>NEW YORK CITY COLLEGE OF TECHNOLOGY</b> The City University of New York	School of Arts and Sciences <b>Biological Sciences Department</b>
<b>Course Information</b>		
<b>Course title</b>	Biology II (Lecture and Laboratory)	
<b>Course code</b>	BIO1201	
<b>Credit Hours</b>	4 credit hours	3 hours lecture and 3 hours lab per week for 15 weeks
<b>Prerequisite</b>	BIO1101	
<b>Text</b>	<b>Lecture</b>	Biology by OpenStax (Rice University); free online or as iBook; print copy available on order: <a href="https://openstax.org/details/biology">https://openstax.org/details/biology</a>
	<b>Lab</b>	“General Biology II Laboratory Manual” (customized) by T. Voza & M. Montes-Matias, McGraw Hill Publishers. ISBN: 9781307024661 eBook available at <a href="https://create.mheducation.com/shop/#/catalog/details/?isbn=9781307032703">https://create.mheducation.com/shop/#/catalog/details/?isbn=9781307032703</a>
<b>Website</b>	<a href="https://openlab.citytech.cuny.edu/oer-biology/">https://openlab.citytech.cuny.edu/oer-biology/</a>	
<b>Material Needed</b>	Lab coat, disposable gloves and dissecting kit, notebook.	
<b>Course Description</b>	This is a continuation of the Biology I (BIO1101) course, focusing on the basic description of living organisms ranging from Prokaryotes to higher Eukaryotes. Topics covered also include animal organization and description of their main organ systems, with a particular attention to how such systems work in humans.	
<b>Grading Procedure</b> (see Grading Policies for details)		
Lecture: 60%		Lab: 40%
The Lecture component will include <u>at least</u> 4 exams plus other assignments. The Lab component will include <u>at least</u> 5 quizzes and 2 practical exams		
<b>Course Coordinator</b>		
<b>Dr. Tatiana Voza</b>		
718-260-5969		TVoza@citytech.cuny.edu
<b>INSTRUCTORS</b> (to fill-in by student)		
<b>Lecture</b>	<b>Name:</b>	
	<b>Email:</b>	<b>Phone:</b>
<b>Laboratory</b>	<b>Name:</b>	
	<b>Email:</b>	<b>Phone:</b>

## Grading Policies

Students' performance in this course will be evaluated as follows:

- Lecture: 60% of course grade; based on at least 4 exams and attendance, respectively 90% and 10% of the lecture grade.
- Lab: 40% of course grade; based on at least 5 quizzes (40% of the lab grade), uniform midterm and final practical exams (50% of the lab grade) and attendance (10% of the lab grade)

ASSIGNMENTS			% OF COURSE GRADE	NOTE	
LabLab	Lab quizzes, account for 40% of the lab grade.	Quiz 1	3.2%	Letter grades will be determined using a standard percentage point evaluation as outlined below:  A: 93-100 A-: 90-92.9 B+: 87-89.9 B: 83-86.9 B-: 80-82.9 C+: 77-79.9 C: 70-76.9 D: 60-69.9 F: Below 60	
		Quiz 2	3.2%		
		Quiz 3	3.2%		
		Quiz 4	3.2%		
		Quiz 5	3.2%		
	Attendance/Participation: 10% of the lab grade		4%		
	The 2 practical exams will be 50% of the lab grade		20%		
Lecture Exam	Lecture exams count for 90 % of the lecture grade	Exam 1	13.5%	Percentage Category:	
		Exam 2	13.5%	Lecture Exams	54%
		Exam 3	13.5%	Lab Quizzes	16%
		Exam 4	13.5%	Lab Practicums	20%
	Attendance/Participation: 10% of the lecture grade		6 %	Attendance/Participation	10%
	Total		100%		

**ALL GRADES ARE COUNTED; NONE ARE DROPPED NOR ARE THEY CURVED. NO MAKE-UPS ARE GIVEN EXCEPT AT THE DISCRETION OF THE INSTRUCTOR PENDING SUBMISSION OF WRITTEN PROOF OF REASON FOR ABSENCE**

### ➔ ATTENDANCE / PARTICIPATION GRADES

Attendance/Participation grades will be based on one of the following (as specified by your instructor):

- Several pop quizzes given at the start and/or end of class (first and last 5 minutes), based on reading assignments (see lecture and lab lecture schedules on pages 5-8), topics discussed in class, lab activities.
- Table below (note that leaving class early counts as "late"):

If meeting <u>once</u> a week:	If meeting <u>twice</u> a week:
0 lateness, 0 absence: 100%	0 lateness, 0 absence: 100%
1-2 absences: 80%	1-2 absences: 80%
3 absences: 50%	3-4 absences: 50%
4 absences or more: 0%	5 absences or more: 0%
2 latenesses = 1 absence	

## **Course Description**

BIO1201 is the second half of first year Biology for non-science and science majors at New York City College of Technology. This course introduces the student to a variety of biological topics fundamental to all living organisms, with a focus on human biology. In particular, the course is a survey of organisms belonging to the Domains Archaea and Bacteria and, more extensively, the groups spanning the four kingdoms of the Domain Eukarya. A special focus will be dedicated to higher animal organization, ranging from animal tissues to organs and organ systems, and how these systems compare and contrast among other vertebrates and invertebrates.

### **Biology II (BIO1201) Learning Outcomes**

Upon satisfactory completion of this course, the student will be able to:

- I. Discuss the contribution of disciplines such as Systematics and Taxonomy to the organization of living organisms. Provide criteria for classification and naming. Explain how organisms are evolutionarily related. Understand the concept of homology.
- II. Identify Prokaryotic organisms and distinguish them from Eukaryotes depending on their cellular characteristics. Provide examples of organisms belonging to the domain Bacteria and the domain Archaea. Elaborate over the contribution of bacterial infections to the development of diseases in the modern society. Explain the differences between Prokaryotes and Viruses and why viruses are not considered alive.
- III. List and explain the characteristics of the kingdom Protista and of the variety of organisms belonging to it. Provide examples of various kinds of protists and how they differ from each other in cell composition, organization and general behavior. Compare the relationships of protists with other organisms, including examples of parasitic and, generally, disease-causing organisms.
- IV. List and explain the characteristics of the Kingdom Fungi and of the organisms belonging to it. Distinguish between AM, zygosporangium, ascospore and basidiospore fungi. Provide examples of the different kinds of fungi, their habitats and their survival skills.
- V. List and explain the characteristics of the kingdom Plantae and of the organisms belonging to it. Explain the concept of alternation of generations and the main differences between gametophyte and sporophyte individuals. Provide classification criteria to distinguish between different kinds of plants. Describe the differences between various plant tissues and their purpose within the plant. Analyze the main kinds of plant organs (roots, stems and leaves) and their contribution to the life cycle of plants. Describe the main steps in plants' reproduction, and the importance of the flower as the main reproductive organ in angiosperms. Distinguish between micro- and macronutrients and their importance within the life of any plant.
- VI. List and explain the characteristics of the kingdom Animalia and of the organisms belonging to it. List the various criteria for animal classification, ranging from the type of symmetry to the presence or absence of an internal body cavity. Distinguish between invertebrates and chordates.
- VII. Describe the four main kinds of animal tissues along with examples of where they can be found in humans and of the purpose they may serve. Explain the purpose of having tissues organized into organs and organs into organ systems within the human body. Present the concept of homeostasis, along with examples of how it may function in humans.
- VIII. Describe vital processes including hemolymph/blood circulation, immunity, gas exchange, food digestion and nutrient absorption, body fluid regulation, control of nervous impulses and reproduction and be able to compare and contrast features in invertebrates versus vertebrates (including humans).

- IX. Dissect and identify the main organs in a fetal pig model. List the components of each main organ system in the provided animal model, and compare them with their counterparts in humans. Dissect and identify the main components of a sheep's brain, and compare them with the corresponding structures in a human brain model.

### **City Tech General Education Common Core Learning Outcomes**

Upon satisfactory completion of this course, the student will be able to:

1. Use Biology as a forum for the study of values, ethical principles, and the physical world.
2. Show curiosity and the desire to learn.
3. Engage in an in-depth, focused, and sustained program of study.
4. Employ scientific reasoning and logical thinking.
5. Derive meaning from experience, as well as gather information from observation.
6. Understand and employ both quantitative and qualitative analysis to describe and solve problems, both independently and cooperatively.
7. Understand and navigate systems.
8. Communicate in diverse settings and groups, using written (both reading and writing), oral (both speaking and listening), and visual means.
9. Value knowledge and learning.
10. Demonstrate intellectual honesty and personal responsibility.

### **CUNY Pathways Common Core Learning Outcomes**

Upon satisfactory completion of this course, the student will be able to:

1. Identify and apply the fundamental concepts and methods of a life science.
2. Apply the scientific method to explore natural phenomena, including hypothesis development, observation and data presentation.
3. Use the tools of a scientific discipline to carry out collaborative laboratory investigations.
4. Gather, analyze, and interpret data and present it in an effective written laboratory or fieldwork report.
5. Identify and apply research ethics and unbiased assessment in gathering and reporting scientific data.

## Lecture Schedule

Chapters are indicated for the Biology by OpenStax (Rice University), <https://openstax.org/details/biology>

<b>WEEK 1</b>	<b>Classification of Living Organisms</b> <ul style="list-style-type: none"> <li>Understanding Evolution</li> <li>Organizing Life on Earth</li> <li>Systematic and evolutionary relationship between organisms</li> </ul>	<b>Sections</b> <b>18.1</b> <b>20.1</b> <b>20.2</b> (also see 47.1 & 47.2)
<b>WEEK 2</b>	<b>Viruses, Bacteria and Archaea</b> <ul style="list-style-type: none"> <li>The Viruses: viral structure, viral reproduction, viral infections; prions &amp; viroids</li> <li>The Prokaryotes - Bacteria and Archaea Domains: diversity, structure and reproduction, metabolism and ecological roles, diseases and uses</li> </ul>	<b>Chap. 21 &amp; 22</b>
<b>WEEK 3</b>	<b>The Protists</b> <ul style="list-style-type: none"> <li>Eukaryotic origins</li> <li>General features of protists</li> <li>Protist Supergroups</li> <li>The Algae: green, red, brown, diatoms</li> <li>Euglenoids</li> <li>The Protozoa (Zooflagellates, Amoebas and Ciliates)</li> <li>Slime &amp; Water Molds</li> <li>Ecological importance</li> </ul>	<b>Chap. 23</b>
<b>WEEK 4</b>	<b>EXAM 1</b> (Classification, Viruses, Bacteria & Archaea and Protists)	
	<b>The Fungi</b> <ul style="list-style-type: none"> <li>Characteristics and structure of Fungi</li> <li>Reproduction of Fungi</li> <li>Classification of Fungi: Zygomycota, <a href="#">Ascomycota</a>, Basidiomycota, Chytridiomycota and AM Fungi</li> <li>Symbiotic Relationships of Fungi: lichens, mycorrhizae</li> </ul>	<b>Chap. 24</b>
<b>WEEK 5</b>	<b>Evolution and Diversity of Plants – Seedless Plants</b> <ul style="list-style-type: none"> <li>Origin of Plants and Colonization of Land</li> <li>Characteristics of plants and Alternation of Generations</li> <li>Non -Vascular and Vascular plants</li> </ul>	<b>Chap. 25</b>
<b>WEEK 6</b>	<b>Seed Plants</b> <ul style="list-style-type: none"> <li>Gymnosperms and Angiosperms</li> <li>Monocots and Eudicots</li> <li>Angiosperms Diversity and Adaptations</li> <li>Angiosperm Reproductive Strategies</li> <li>Pollination, Fertilization and Seed/Fruit Dispersal</li> </ul>	<b>Chap. 26</b> <b>&amp;</b> <b>Sections</b> <b>32.1</b> <b>32.2</b>
<b>WEEK 7</b>	<b>EXAM 2</b> (The Fungi and Plants: Evolution, Diversity and Reproduction)	
	<ul style="list-style-type: none"> <li>Introduction to Animals and their Classification: level of organization, type of symmetry, type of coelom, segmentation and embryology, protostomes and deuterostomes</li> <li>Overview of Animal Phyla: Invertebrates and Vertebrates</li> </ul>	<b>Sections</b> <b>27.1, 27.2,</b> <b>27.3 + Chap.</b> <b>28 + Section</b> <b>29.1</b>

WEEK 8	<b>Animal Organization</b> <ul style="list-style-type: none"> <li>Form and function</li> <li>Types of tissues</li> <li>Homeostasis: negative and positive feedback</li> </ul>	Chap. 33
WEEK 9	<b>Circulation</b> <ul style="list-style-type: none"> <li>Overview of circulatory systems</li> <li>The mammalian circulatory system, pressure and flow</li> <li>Blood and Blood Types</li> </ul>	Chap. 40
WEEK 10	<b>Immunity</b> <ul style="list-style-type: none"> <li>Overview of immune systems</li> <li>The immune system: specific and non-specific defenses</li> <li>Antibodies</li> <li>Disruptions in the immune system</li> </ul>	Chap. 42
WEEK 11	<b>EXAM 3</b> (Kingdom Animalia and Animal Organization & Homeostasis, Circulation, Lymphatic System)	
	<b>Digestion and Nutrition</b> <ul style="list-style-type: none"> <li>Overview of digestive systems and adaptations to diet</li> <li>Human digestive system</li> <li>Nutrition</li> </ul>	Chap. 34
WEEK 12	<b>Respiration</b> <ul style="list-style-type: none"> <li>Overview of respiratory systems</li> <li>Breathing</li> <li>Transport of gases in humans</li> </ul>	Chap. 39
WEEK 13	<b>Body Fluid Regulation and Excretion</b> <ul style="list-style-type: none"> <li>Osmoregulation</li> <li>Waste products and excretory systems</li> <li>The human urinary system and its regulation</li> </ul>	Chap. 41
WEEK 14	<b>Nervous System</b> <ul style="list-style-type: none"> <li>Overview of nervous systems</li> <li>Neurons and glial cells</li> <li>CNS and PNS</li> <li>Drug abuse and neurodegenerative diseases</li> </ul>	Chap. 35
WEEK 15	<b>Reproduction</b> <ul style="list-style-type: none"> <li>Asexual and sexual reproduction</li> <li>Fertilization</li> <li>Male and female reproductive system</li> <li>Regulation of human reproduction</li> <li>Pregnancy and infertility</li> </ul>	Chap. 43
	<b>EXAM 4 - FINAL</b> (Digestion -Nutrition, Respiration, Excretion, Nervous System & Reproduction)	

### Academic Integrity Policy

“Academic dishonesty includes any act that is designed to obtain fraudulently, either for oneself or for someone else, academic credit, grades, or any other form of recognition that was not properly earned. Academic dishonesty encompasses the following:

**Cheating:** Defined as intentionally giving, receiving, using or attempting to use unauthorized materials, information, notes, study aids, including any form of unauthorized communication, in any academic

exercise. It is the student's responsibility to consult with instructors to determine whether or not a study aid or device may be used.

*Plagiarism:* Plagiarism is intentionally and knowingly presenting the ideas or works of another as one's own original idea or works in any academic exercise without proper acknowledgement of the source. The purchase and submission of a term paper, essay, or other written assignment to fulfill the requirements of a course, and violates section 213-b of the State Education Law. This also applies to the submission of all or substantial portions of the same academic work previously submitted by the student or any other individual for credit at another institution, or in more than one course.



## Laboratory Schedule

Pages are indicated for "General Biology II Laboratory Manual" by T. Voza, & M. Montes-Matias, McGraw Hill Publishers

<b>Week 1</b>	<b>Taxonomy: Classification and Naming of Living Organisms</b> <ul style="list-style-type: none"> <li>List the taxonomic levels from the broadest to the most specific.</li> <li>Explain the degree of similarity and difference between organisms classified in a taxonomic table.</li> <li>Identify animals and plants through the use of a dichotomous key.</li> </ul>	2-14
<b>Week 2</b>	<b>Domain Bacteria and Kingdom Protista</b> <ul style="list-style-type: none"> <li>Describe the distinguishing features of members of the Domain Bacteria.</li> <li>Describe differences between bacteria and cyanobacteria.</li> <li>Discuss the distinctive features of each group of algae and protozoans.</li> <li>List examples, habitats, reproductive methods, and unique features of representative members of the Kingdom Protista.</li> </ul>	15-30
<b>Week 3</b>	<b>Quiz 1(Taxonomy, Bacteria, Archaea and Protists)</b>	
	<b>Kingdom Fungi</b> <ul style="list-style-type: none"> <li>Describe the characteristic features of Kingdom Fungi.</li> <li>Explain the division names: Chytridiomycota, Zygomycota, Ascomycota, Basidiomycota and AM Fungi.</li> <li>Discuss variations in structure and the sequence of events for sexual reproduction for the major divisions of the Kingdom Fungi.</li> </ul>	31-43
<b>Week 4</b>	<b>Kingdom Plantae I – Bryophytes, Ferns</b> <ul style="list-style-type: none"> <li>Describe the process of alternation of generations.</li> <li>Explain the criteria for plants classification: conducting tissue, seeds and flowers and distinctive evolutionary features</li> <li>Discuss similarities and differences between ferns and bryophytes.</li> <li>Describe the life cycles of ferns and their allies.</li> </ul>	45-58
<b>Week 5</b>	<b>Kingdom Plantae II – Gymnosperms &amp; Angiosperms</b> <ul style="list-style-type: none"> <li>Describe the life cycle of a pine tree (gymnosperm)</li> <li>Describe the life cycle of flowering plants (angiosperms)</li> <li>List and give the functions of the principal parts of a flower.</li> <li>Describe the structure and function of roots, stems, and leaves.</li> <li>Observe and explain characteristics of fresh monocots and eudicots sprouts</li> </ul>	59-77 81;84 87-88
<b>Week 6</b>	<b>Quiz 2 (Fungi &amp; Plants)</b>	
	<b>Kingdom Animalia I - Lower Invertebrates</b> <ul style="list-style-type: none"> <li>Explain and discuss animal classification (levels of organization, body symmetry, coelom, protostomes, deuterostomes)</li> <li>Describe the distinguishing features of members of the phylum Porifera and the phylum Cnidaria. Describe the body forms of cnidarians. Compare the feeding methods of sponges and jellyfish. Observe the feeding behavior of live hydra capturing live water fleas (daphnia; crustaceans).</li> <li>Describe the general morphology of flatworms (phylum Platyhelminthes). Observe the morphology and behavior of live Planaria</li> </ul>	91-105

Week 7	<b>Kingdom Animalia II - Lower Invertebrates (continued)</b> <ul style="list-style-type: none"> <li>Describe the general morphology, major classes and advanced characteristics of roundworms (phylum Nematoda) and rotifers (phylum Rotifera). Observe the behavior of live rotifers.</li> <li>Describe the general morphology of organisms of phylum Annelida and phylum Mollusca. Dissect preserved earthworms and bivalves (clams)</li> </ul>	105-122
Week 8	<b>Kingdom Animalia III – Arthropods and Chordates</b> <ul style="list-style-type: none"> <li>Describe the general morphology, characteristics and major classes of phylum Arthropoda. Describe modifications of the exoskeleton and paired appendages of arthropods. Observe preserved insect specimens (grasshoppers)</li> <li>Describe the morphology, characteristics of the phylum Echinodermata. Dissect preserved sea stars (if available).</li> <li>Describe the morphology, characteristics of the phylum Chordata. Dissect preserved frogs</li> </ul>	123-145; 152
Week 9	<b>UNIFORM MIDTERM PRACTICAL + Quiz 3 (Animals)</b>	
	<b>Vertebrate Organization – Tissues and Organs</b> <ul style="list-style-type: none"> <li>Describe the general properties of tissues versus single cells</li> <li>Describe the characteristics of epithelial, connective, muscular and nervous tissues</li> <li>Describe the organization of the skin as an organ made of several tissues working together</li> </ul>	153-168
Week 10	<b>Vertebrate Anatomy I – Real &amp; Virtual Fetal Pig Dissection</b> <ul style="list-style-type: none"> <li>Understand the classification of the pig as a mammal; name the unique mammalian characteristics represented by the fetal pig.</li> <li>Define all the anatomical terminology, planes and structures</li> <li>Dissect and identify the components of the digestive and respiratory systems of the fetal pig;</li> </ul>	169-183
Week 11	<b>Vertebrate Anatomy II – Real &amp; Virtual Fetal Pig Urogenital System</b> <ul style="list-style-type: none"> <li>Identify, observe and dissect the heart and pericardium; identify major blood vessels.</li> <li>Define, identify, and describe components of the female and male urogenital system of the fetal pig.</li> </ul>	220-222
Week 12	<b>Quiz 4 (Vertebrate Anatomy: Tissues, Organs and Organ Systems)</b>	
	<b>Vertebrate Anatomy III – Organs of Homeostasis - Urinalysis</b> <ul style="list-style-type: none"> <li>Define homeostasis and why it is an important characteristic of every life form</li> <li>Describe the structure and function of the human lungs, liver and kidneys and their role in the maintenance of homeostasis</li> <li>Describe the process of urine formation in the human kidney</li> <li>Explain and discuss negative and positive feedback mechanisms.</li> <li>Test urine samples, discuss and explain results</li> </ul>	185-202
Week 13	<b>The Nervous System - Sheep Brain</b> <ul style="list-style-type: none"> <li>Define and describe the components of the central and peripheral nervous systems</li> <li>Identify the components and basic function of the sheep brain and their human counterparts on the models available</li> <li>Describe the structure of the spinal cord and the mechanism underlying reflexes</li> </ul>	203-209

<b>Week 14</b>	<b>Quiz 5 (Physiology: Homeostasis, Organ Functions and Nervous System)</b>	
	<b>Reproduction &amp; Development</b> <ul style="list-style-type: none"> <li>▪ Human male and female reproductive systems and cycles</li> <li>▪ Describe the main steps in the embryological development of vertebrates</li> <li>▪ Identify the various stages in the developmental models provided</li> </ul>	219-234
	<b>Review for Final Practicum</b>	
<b>Week 15</b>	<b>UNIFORM FINAL: FETAL PIG/BRAIN PRACTICUM</b>	